The impact of commodity price rises on consumers' food price inflation: Differences among income groups.

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Abstract

The substantial rise of world prices of agricultural products due to a host of mutually supporting factors that influenced both their supply and demand between 2005 and the first half of 2008 led to a subsequent increase in the price of food at the retail level. Although this trend has reversed recently, official views and researchers stress that within the next ten years the real term prices of important agricultural products are expected to increase substantially to the detriment of, mainly the lower income, consumers.
This paper examines the impact of commodity price rises on consumers' food price inflation. It searches among the differences in the composition of food expenses and presents indicative results of a quite different food consumption pattern among EU member states' consumers and within countries. It highlights the impacts of the observed food price increases not only upon low income households, which were found to be relatively more affected than their higher income counterparts, but upon member states with a lower level of economic development as well, which seemed to have lost their price convergence pace. Hence, it stresses the importance of adequate and prompt policy design to alleviate the consequences of future negative price developments.

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1. Introduction

Between the marketing years 2005 and 2007 world prices of agricultural products such as corn and wheat almost doubled and continued to rise through the first half of 2008. Dairy products' prices, and to a lesser extend meat prices, demonstrated substantial increases in 2007. Such price rises have been attributed to a host of mutually supporting factors linked to both supply and demand such as droughts in exporting countries and regions, the reorientation of production of food commodities to satisfy biofuels' demand, rising oil prices, the devaluation of the U.S. dollar and the coincidental and parallel depletion of stocks. In addition, as indicated lately, speculation practices characterizing the futures markets for agricultural products, in the context of the international financial crisis, is believed to have played a crucial role. Agricultural commodity price increases, coupled by relevant increases in the price of oil which triggered higher costs of food processing and transportation led to an increase in the price of food at the retail level. (OECD – FAO, 2008) Since the middle of the year 2008 and up to the present a fall in prices of many commodities has been observed. The current economic crisis has been affecting agricultural product prices and incomes at the European and world wide level. However, prices are expected to recover as a result of global food and biofuel demand coupled, as indicated, by a decrease in the rate of growth of productivity in agriculture. (European Commission, 2009)

Such developments raise important questions about the severity of the impact that basic commodities' and food items price raises may have upon consumers, especially those in the lower income groups of the population whose food expenses take up a major share of total expenditures. The surge in commodity price raises has been a matter of concern at the highest level in the European Union. The European Council has expressed its apprehension as regards low income households in the different member states. In an effort to cope with undesirable price developments for such households, the Union has moved to boost supply by curbing export refunds, by removing compulsory set aside regulations, by increasing milk quotas and by curtailing import duties. In the context of the Health Check further steps have been taken along the same lines. (Council of the E.U., 2008)

This study does not focus on the examination of all possible factors that could explain the recent hike in prices.

2. Differences in the composition of expenses among consumers & member states

As expected, the share of households' disposable income that corresponds to expenses for the purchase of food decreases as the household's income and welfare is enhanced. On the average, this share, expressed as a percentage of total expenses, varies among different income categories as well as among different member states, it depends on the state of economic development and tends to decrease with time as incomes and welfare increase. On the basis of the analysis of data offered by the Household Budget Survey (HBS) large differences in the relevant importance of household expenditures among the various member states, as related to food items, are demonstrated on Table 1. It is observed, for example that in the year 2005, the average household in Romania spent 41.9% of its total disposable income for the purchase of food items, whereas the respective figure for Luxembourg was only 8.3% (column "*a*"). The average households' expenditures on food items, as a percentage of total expenditure were 12.6% and 15.7% for the EU–15 and the EU–27 respectively. Differences in the composition of expenses are explained by the varying levels of economic development among member states.

Differences in household expenditures on food items among the various income categories within member states are also profound. Households in each member state are classified in five classes (quintiles) according to their level of income. The differences in the share of expenditures attributed to food items as a percentage of total expenditures between the income group of the lowest and that of the income group of the highest income are presented in column "*b*" of Table 1. In Sweden, for example, the share of the total expenses of

households that belong to the quintile with the lowest income attributed to food items is only 2.4 percentage points higher than that of households that belong to the quintile with the highest income. On the other end of the scale, the figures for Romania and Lithuania are 24.8% and 20.0% respectively. Differences between the two extreme income quintiles, in the various member states, seem to be inversely related to the level of economic development, thus, the higher the level of economic development characterising a member state the smaller the difference. The degree of divergence between income quintiles, however, mainly depends on the nature of income distribution in each member state.

Table 1: Average households' expenditures on food items in the EU member states - 2005

Member state	Expenditures on food items as % of total expenditures (a)	Difference in expenditure % between the lowest and highest quintile (b)	Ratio of expenditures for food: % low income quintile / % high income quintile (c)	Share of income % attributed to food items for the lowest income quintile (d)
EU. - 15	12.6	7.4	1.78	16.9
EU. - 27	15.7	8.8	1.74	20.8
Luxembourg	8.3	5.8	1.92	12.1
United Kingdom	9.1	4.8	1.69	11.8
Netherlands	9.6	2.5	1.30	10.8
Sweden	9.7	2.4	1.30	10.4
Germany	10.1	6.8	1.94	14.0
Denmark	10.8	3.1	1.33	12.5
Ireland	11.1	7.9	1.95	16.2
Austria	11.7	5.2	1.60	13.9
Finland	11.7	4.8	1.51	14.3
Belgium	12.1	4.7	1.48	14.5
Cyprus	12.4	14.4	2.76	22.6
France	12.4	3.1	1.29	13.9
Greece	14.7	9.7	1.92	20.2
Portugal	14.8	10.4	1.95	21.3
Slovenia	15.2	6.7	1.51	19.9
Spain	17.0	12.0	2.02	23.8
Italy	17.7	14.5	2.16	27.0
Czech Republic	18.5	7.7	1.55	21.7
Malta	18.9	15.3	2.01	30.5
Hungary	20.6	12.5	1.85	27.2
Estonia	20.8	13.4	1.88	28.7
Poland	23.7	9.6	1.50	28.7
Slovakia	24.6	11.5	1.60	30.7
Latvia	27.4	18.7	1.96	38.2
Bulgaria	30.2	18.3	1.77	42.0
Lithuania	31.8	20.0	1.85	43.4
Romania	41.9	24.8	1.78	56.8

Source: Calculations based on the Household Budget Survey, Harmonized Index of Consumer Prices, & Eurostat data.

The share of income corresponding to the lowest income quintile, expressed as percentage, is indicated by column *"d"* of Table 1, whereas on column *"c"* the ratio of expenditures for food (%) by households in the low income quintile as compared to households in the high income quintile is recorded. In the year 2005, for example the average household in the lowest income quintile in the Netherlands spends 10.8% of its total disposable income on food corresponding to a share (%) which is 1.3 times higher than the respective figure for the highest income quintile. In Cyprus, the average household in the lowest income quintile allocates 22.6% of its income for the purchase of food items thus revealing a share which is almost three times higher (2.76) than the average share of the highest income quintile.

Although the analysis has been extended to incorporate the evolution of income shares of the different income quintiles through time findings have been omitted in order to allow for a briefer and simpler presentation of the results. Necessary calculations on the basis of data available for the years 1988, 1944, and 1999 have demonstrated that the share of disposable income of households belonging to lower income quintiles that was spent for the purchase of food items has been steadily shrinking in all member states as the level of income and economic development increased. Average differences between low and high income households also diminished.

Given the situation just presented it is established that the various income groups across member states exhibit a rather differentiated paradigm as related to their consumption practices, and a unique set of weights characterizes the different expenditure categories. Such deviations tend to disappear with time. In compiling national inflation indexes statistical services, at the national level, are therefore compelled to utilize different coefficients that take into account such disparities and diversities in consumption patterns. This analysis proceeds to examine differences in consumption patterns among member states as well as among social groups within member states.

Table 2: Harmonized Index of Consumer Prices (2001, 2008)

Member State	HICP: Item weights Food (%)	
	2001	2008
E.E 15	13.7	13.1
E.E 27	15.3	14.6
Luxembourg	10.6	9.7
United Kingdom	10.3	9.5
Netherlands	13.8	12.4
Sweden	13.9	13.6
Germany	10.2	10.6
Denmark	13.9	13.7
Ireland	17.5	12.1
Austria	11.7	11.5
Finland	15.4	14.0
Belgium	15.0	16.0
Cyprus	17.4	16.1
France	15.4	14.8
Greece	19.7	16.5
Portugal	21.0	18.0
Slovenia	18.8	15.8
Spain	19.9	19.2
Italy	15.9	16.6
Czech Republic	18.7	17.1
Malta	15.2	15.9
Hungary	19.1	17.2
Estonia	22.9	19.3
Poland	28.5	20.9
Slovakia	21.2	16.1
Latvia	29.1	22.0
Bulgaria	40.9	22.9
Lithuania	34.3	23.2
Romania	39.6	34.5

Source: Calculations based on the Household Budget Survey, Harmonized Index of Consumer Prices, and Eurostat data.

After the Maastricht Treaty and the establishment of the Economic and Monetary Union, member states utilize the Harmonized Index of Consumer Prices (HICP) in order to estimate inflation levels in a way that guarantees comparable results. Table 2 presents the weighted coefficients corresponding to the consumption of food items as utilized by Eurostat in calculating inflation for the years 2001 and 2008. Such data is required in estimating the impact an increase in the weighted price of food items might have on general inflation. In 2008 for example, the doubling of food prices or a general food price increase by 100%, would have led to an increase of inflation in Austria by 11.5% and in Poland by 20.9%. A few years earlier, in 2001, inflation in Austria would have practically experienced a similar increase (11.7%) whereas in Poland inflation would have reached the level of 28.5%. A change in the price of food items has a different impact upon the general rate of inflation among member states depending on the respective coefficient or the harmonized index of consumer prices, as shown on Table 2.

Information revealed on Table 3 indicates that different weights are ascribed to eight distinct product categories in the various member states. Such differences reflect the respective significance each food category enjoys in the average consumption pattern of the citizens. For example, the average Bulgarian consumer allocates one fourth (25%) of his total expenditures for food for the purchase of bread and cereals as compared to the average consumer in Greece who spends just 13.1% of his total food expenditures for the purchase of food items of the same category. On the other hand, it is indicated that, according to consumption patterns in Greece, consumers reveal their consumption preferences by attributing a high significance to the consumption of olive oil which is one of the products that is included in the “oils and fats” category. The respective figures that correspond to any of the Scandinavian countries do not exceed the threshold of 3.0%. Consequently, a clear differentiation is recorded which is attributed not only to income but also to the weights consumers in each member state attach to the different food categories according to their established consumption patterns.

Table 3: Share (%) of the various food categories in total food expenditures (2008)

Member State	Food product category								
	Bread & cereals	Meat	Fish & seafood	Milk, cheese & eggs	Oils & fats	Fruit	Vegetables	Sugar, jam, etc	Other food
Greece	13,1	23,3	7,6	19,1	10,0	8,0	12,0	6,0	0,8
France	15,3	29,1	8,6	16,3	2,7	7,3	9,7	7,1	4,0
Sweden	16,3	20,1	6,4	18,3	2,7	8,5	11,2	11,8	4,9
Spain	16,4	26,4	14,6	15,2	3,9	9,0	9,2	3,4	1,9
Estonia	16,5	27,1	4,8	20,7	3,6	7,5	9,8	7,4	2,6
U.K	16,8	22,1	5,3	14,7	2,1	9,5	15,8	11,6	2,1
Slovakia	17,1	27,9	1,6	21,1	5,5	7,8	9,1	6,7	3,2
Czech	17,5	25,6	2,7	20,3	4,8	9,5	9,3	6,9	3,5
Portugal	17,6	25,9	17,7	13,2	4,4	8,3	8,9	2,9	1,2
Germany	17,9	22,5	3,5	17,5	3,2	10,3	12,5	8,0	4,5
EU - 15	17,9	25,4	7,9	15,9	3,8	8,4	10,9	6,7	3,0
Denmark	18,1	21,6	4,5	16,5	2,8	7,2	13,9	12,0	3,4
EU - 27	18,2	25,2	6,8	16,2	3,9	8,2	11,3	7,3	3,0
Cyprus	18,5	24,7	4,1	19,3	3,7	9,8	13,1	5,2	1,8
Finland	18,8	22,0	4,7	19,2	2,5	8,5	11,5	9,9	2,8
Hungary	18,9	23,3	0,9	21,1	5,5	7,6	11,7	6,8	4,2
Slovenia	19,3	26,2	3,1	17,6	3,8	8,8	9,8	7,4	4,0
Poland	19,5	28,6	3,2	16,2	6,1	5,8	9,7	7,0	3,9
Latvia	19,5	26,9	5,0	19,8	3,7	6,8	9,1	6,7	2,5
Lithuania	19,9	27,8	5,9	16,7	4,5	6,6	7,9	7,4	3,3
Ireland	19,9	23,5	3,2	13,2	2,7	7,5	14,2	8,5	7,4
Austria	19,9	24,5	3,0	18,0	3,7	7,9	11,2	8,6	3,2

Member State	Food product category								
	Bread & cereals	Meat	Fish & seafood	Milk, cheese & eggs	Oils & fats	Fruit	Vegetables	Sugar, jam, etc	Other food
Malta	20,2	22,4	6,5	16,1	3,5	9,7	13,6	5,3	2,6
Netherlands	20,7	21,0	3,9	14,7	1,6	8,2	11,2	8,4	10,2
Belgium	20,7	28,3	6,4	14,0	2,5	7,1	10,0	7,0	4,1
Italy	21,1	25,1	7,4	14,6	5,1	7,7	11,6	7,1	0,3
Luxembourg	21,2	23,5	6,6	17,6	3,4	6,8	8,5	8,5	3,9
Romania	23,7	25,9	3,3	16,5	5,6	6,5	11,5	5,2	1,8
Bulgaria	25,0	17,7	1,8	17,0	5,8	6,2	15,8	7,9	2,8

Source: Harmonized Index of Consumer Prices, and Eurostat data

From the preceding discussion, it is concluded that as lower income consumers allocate a larger portion of their income on food, the increase of food commodity prices affects them relatively more than it does to their higher income counterparts. In addition, food commodities which experienced steep price increases, normally account for a larger share of food expenditures for low income households thus, again, affecting low income consumers more than high income ones. (Trestle, 2008)

3. The recent surge of food prices and its consequences

In spite of their general declining trend, explained by the regular adoption of technological innovations that lead to a supply increase which is coupled with an inelastic demand, world prices of agricultural products have recently demonstrated a substantial rise that has had detrimental effects primarily to lower income consumers (Banse et. all, 2008). Prices have refrained from rising and in fact they have dropped since the beginning of the second half of 2008, however, they are not expected to come down to their historical levels. In their *Agricultural Outlook* (2008), OECD and FAO predict that *"on average, over the coming ten years period, prices in real terms of cereals, rice and oilseeds are projected to be 10% to 35% higher than in the last decade"*.

Prices of products just pointed out (cereals, rice, oilseeds) nearly doubled between the 2005 and 2007 marketing years and continued to rise until the end of the first half of 2008. During the same period, dairy products also demonstrated price increases whereas price increases for meat were rather modest. Such developments led to a substantial increase of the cost of food to the consumer. In its recent report OECD (2008) states: *"The agricultural commodity price component of final food product prices is relatively small (often 35% or less) as is the proportion of disposable income spent on food (10 – 15% for most OECD countries). Of course these averages mask much more significant impacts on lower income consumers who spend a larger share of their expenditure on food."*

Information provided on Table 4 below confirms that for a rather long period of time (2001 – 2006) EU–27 member states, in general, were not affected by high food product prices (2.37% annually). During the same period the increase of the general price index for all goods and services was also limited (2.10% annually). In 2007, however, increases in food prices, for certain member states such as Denmark, Austria and the United Kingdom clearly begin to exceed the rise of the prices that corresponds to all goods and services. In 2008, food price rises are profound for all member states without exceptions. On the average, food price increases, as calculated for the EU – 27, reached 6.70% while the respective average increase recorded for all goods and services was about half (3.66%). In any case food prices rose faster than the rate of inflation. For certain member states the food price index registered surpassed the 10% mark. The biggest increases occurred in those countries of the European Union which have a lower level of economic development.

Table 4: Price changes (%) during the period 2001 – 2006 and the years 2007 and 2008

Member state	All goods and services			Food products		
	Yearly average 2001-2006	2007	2008	Yearly average 2001-2006	2007	2008
EU - 27	2.10	2.34	3.66	2.37	3.51	6.70
EU - 15	2.20	2.14	3.28	2.42	2.74	5.68
Belgium	2.04	1.82	4.49	2.58	3.92	6.32
Bulgaria	5.85	7.57	11.95	3.82	13.79	16.55
Czech Republic	2.02	2.95	6.25	1.05	4.67	8.09
Denmark	1.85	1.67	3.61	1.61	4.34	7.58
Germany	1.63	2.28	2.75	1.26	3.03	5.59
Estonia	3.70	6.74	10.61	3.83	9.88	14.64
Ireland	3.31	2.87	3.11	2.00	2.94	6.71
Greece	3.47	2.99	4.23	3.56	2.15	5.51
Spain	3.25	2.84	4.13	4.34	3.73	5.94
France	2.01	1.61	3.16	2.22	1.41	5.19
Italy	2.41	2.04	3.50	2.51	3.01	5.58
Cyprus	2.49	2.16	4.38	4.65	5.49	7.54
Latvia	4.51	10.08	15.25	6.25	13.87	18.84
Lithuania	1.40	5.82	11.09	2.16	11.42	16.37
Luxembourg	2.83	2.65	4.09	2.85	3.62	5.75
Hungary	5.55	7.93	6.03	5.21	12.77	10.67
Malta	2.48	0.70	4.68	1.81	4.11	9.13
Netherlands	2.62	1.58	2.21	1.67	1.36	5.75
Austria	1.84	2.20	3.22	1.84	4.47	6.70
Poland	2.50	2.60	4.19	2.05	4.81	5.93
Portugal	3.17	2.42	2.65	2.33	2.49	3.79
Romania	16.64	4.91	7.91	11.61	4.01	9.88
Slovenia	5.06	3.76	5.53	3.80	7.54	10.25
Slovakia	5.60	1.89	3.93	2.90	4.03	7.30
Finland	1.36	1.58	3.91	1.79	2.08	8.95
Sweden	1.71	1.68	3.35	1.42	2.14	7.28
United Kingdom	1.60	2.32	3.61	1.90	4.57	10.05

Source: Calculations of the Consumer Price Index, Eurostat.

Prices have demonstrated differentiated performance among the different food product categories for a host of reasons. The retail market for food products has been historically fragmented and remains so. Hence, allegedly, price differences, at the retail level, of the same product marketed in the different member states are explained by structural – market organization and competition characteristics prevailing in each market. It is likely that retail enterprises reveal a different behavior with respect to the profit margins they seek depending on their ability to impose prices that serve their medium to long term interests. Thus an external shock such as the agricultural commodities price surge, although common to all, might have varying consequences among member states concerning food product price hikes. Commercial enterprises engaged in retail trade of food products adjust their trade policies, strategies and tactics according to the competitive power they attain in the market and are ready to compromise and adjust their profits downwards whenever the socioeconomic situation does not leave room for transferring of additional burdens to the consumers by increasing food product prices further. In markets where, for various reasons, profit margins for retailers were relatively compressed agricultural commodities' price distortions were directly carried over to consumers. Further investigation of the competitive structure of the agribusiness sector, at all levels along the supply chain, could lead to a pragmatic assessment of the phenomenon. Additional reasons that justify a differentiated impact of agricultural products' price increases upon retail prices of food products in the different markets are competition policies designed and implemented by member states and the role governments

play as regulators of the market, the common agricultural policy harmonization processes in effect in the twelve countries that took part in the last two accessions, as well as the fact that agricultural products' participation in the total cost of the final food product varies from one member state to the other. (Commission of the European Communities, 2008 b)

The price index for selected food product categories is outlined on Table 5. Bread and cereals, the price of which rose by 15% during the calendar years 2007 and 2008, meat which experienced an increase by 9% and milk and eggs the price of which rose by 15% are the three major food classes in the E.U. which account for about 60% of total food consumption. During the same period the respective prices for bread and cereal rose by 47% in Latvia, 43% in Bulgaria, 40% in Lithuania and 36% in Estonia. Greece experienced the highest price increase (19%) among the E.U. – 15 countries for bread and cereals, contrary to rather modest price increases observed for the other two major product classes. In general, the average household in the E.U. has seen its food expenses increased during the reference period examined. Higher food expenditures undertaken however have had a rather modest impact on its members purchasing power and standard of living as the share of food expenditure in the total household's expenditure is rather limited (Commission of the European Communities, 2008 b). Such an observation seizes to be valid, of course, when the argument is extended to include low income member states and, even more, low income households across the E.U.

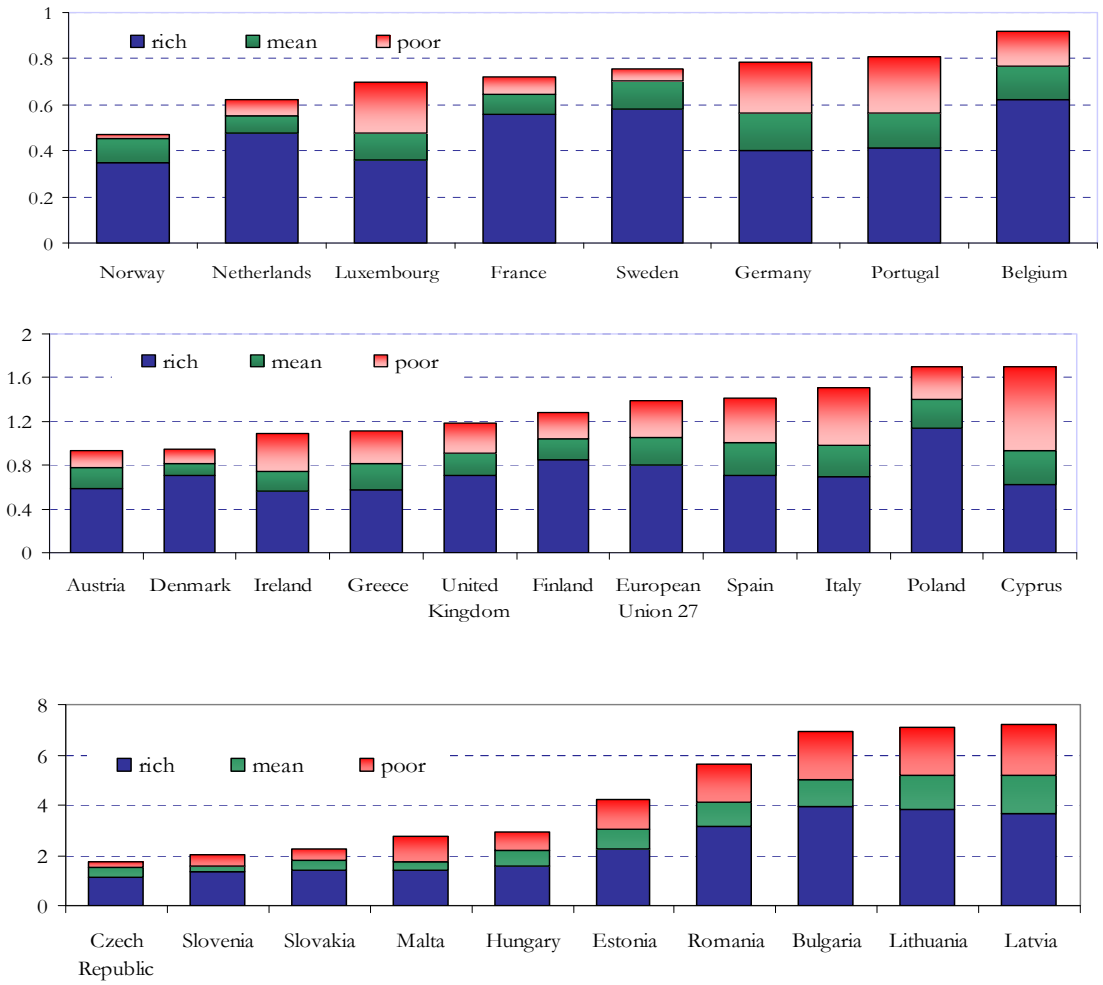
Table 5: Price index for selected agricultural commodities (January 2007 = 100)

Member State	Bread & cereals		Meat		Milk, cheese & eggs		Oils & fats	
	Jan'08	Jan'09	Jan'08	Jan'09	Jan'08	Jan'09	Jan'08	Jan'09
EU - 27	109	115	104	109	114	115	110	113
EU - 15	108	113	103	107	113	113	106	106
Belgium	111	116	102	106	116	118	110	119
Bulgaria	137	143	106	124	128	132	166	142
Czech Republic	121	122	105	107	122	113	120	118
Denmark	112	117	100	106	117	117	120	126
Germany	107	111	102	107	120	112	121	118
Estonia	123	136	112	119	135	128	128	141
Ireland	113	114	102	107	116	124	112	123
Greece	113	119	103	107	106	109	102	100
Spain	110	114	104	108	117	116	97	93
France	104	108	104	107	109	110	107	109
Italy	108	116	104	106	107	111	102	104
Cyprus	111	124	103	115	105	111	104	120
Latvia	131	147	116	134	135	138	129	154
Lithuania	121	140	115	142	129	123	128	139
Luxembourg	107	111	104	108	113	115	107	115
Hungary	125	129	104	113	119	120	121	142
Malta	109	121	104	110	111	120	109	123
Netherlands	106	110	101	105	115	119	110	117
Austria	110	114	104	109	116	112	114	114
Poland	112	119	106	113	115	112	115	117
Portugal	108	114	102	103	111	111	103	107
Romania	112	118	101	109	108	118	134	153
Slovenia	113	119	110	113	132	132	127	145
Slovakia	120	129	102	105	114	108	113	124
Finland	107	113	105	113	110	122	110	118
Sweden	108	115	102	110	109	113	109	112
United Kingdom	108	118	102	117	115	125	116	124

Source: Calculations based on the Consumer Price Index data (Eurostat)

Diagram 1 illustrates the impact food product price rises have had on the rate of inflation for each of E.U. – 27 member states and Norway as well as for the Union as a whole. The bottom (blue) segment of each pillar corresponds to inflation that has affected the "*richest*" quintile of all households. The average effect of food products' price rises on inflation corresponds to the sum a) of the middle (green) segment of each pillar and b) the bottom (blue) segment. The effect on inflation for the "*poorest*" quintile emerges when the top (red) segment of the pillar is added. In other words, the sum of the middle (green) and the top (red) segments make up the difference in inflation between poor and rich households in each member state that has come about as a result of food product price rises during the year 2008. It is interesting to note that in certain member states such as Cyprus, Italy and Spain and to a lesser extent Greece and Ireland the effect of inflation on the low income households is (more than) double than the effect on the high income households.

Diagram 1: The cumulative impact of food products' price rises on inflation (2008)



Source: Calculations based on primary HBS data for 2004/2005 and Eurostat

4. Further analysis, the case of food products in Greece

Household budget survey data carried out in Greece in the year 2005 are utilized in this section and shares of expenditures on the various product categories are reassessed for the different income groups. The general consumption pattern for the entire population, on which the National Statistical Service assigns weights to be used for determining the Consumers Price Index, has been broken down and separate consumption patterns have been defined for the different income groups. More specifically, *weights* have been estimated for the different

groups of the population, according to their income status, giving special emphasis on food product classes. Income groups have been classified as *"poor"* and *"not poor"* and have also been separated according to the income quintile they belong. Such *weights* were used for the estimation of the specific Consumer Price Index that corresponds to each group.

In mathematical terms, each specific Consumer Price Index has been calculated by means of the relationship:

$$I_t^g = \sum_{i=1}^{k} w_i^g I_{it} \qquad (1)$$

where,

I_t^g = the Consumer Price Index of group (g) and,

w_i^g = the share of product class (i) that contributes to total expenditure of households that belong to group g during the reference period or the *weight* of index (I_{it}) for group (g)

Similarly, inflation (π_t^g) which is relevant for household group (g) between periods (t) and (t-1), that corresponds to a percentage change of price levels between the two periods, has been calculated by means of the relationship:

$$\pi_t^g = 100 * (\frac{I_t^g}{I_{t-1}^g} - 1) \qquad (2)$$

The amount of total expenses, whether real or inferred, was used as a proper criterion in setting households in order according to their economic "status". Economies of scale in consumption behavior as well as the difference in needs between the elderly and the youth were also taken into account.

A clear record of the major differences observed in the composition of consumption among the various income groups is essential. For this purpose, on Table 6, the population is classified into two groups on the basis of *"poor"* and *"not poor"* household distinction. *"Poor"* households are the households whose income is less than 60% of the mean income of all households. Total expenditures were classified into eight (8) basic categories, seven (7) of which refer to food items whereas *"not poor"* are households whose income is above 60% of the mean income of all households.

According to findings presented on Table 6, *"poor"* households spend 30.77% of their income on food (column a) while the respective figure for the *"not poor"* households is only 16.86% (column b). Expenditures of *"poor"* households appear to be higher than respective expenditures of the *"not poor"* households for most food product categories with the exception of food and beverages consumed outside the house (column 7). It becomes evident that differences in the structure of consumption expenditures, allocated to the purchase of food items, between the two distinct income classes are profound and depend on the level of economic well being. Columns (e) and (g) of Table 6 outline the changes that have occurred in the composition of consumption since the last relevant survey that was carried out in the year 1999. *"Poor"* households have curtailed their expenditures on food items (categories 1 – 7) by 4.6 percentage points by increasing their non food expenditures. The relative reduction of food expenditures is partly due to restrictions imposed upon the consumption of food and beverages away from home. On the contrary, *"not poor"* households have not adjusted the composition of their consumption to a substantial extent.

Table 6: Structure of consumption expenditures as % of total expenditures (2005) and rate of change (2005/1999)

Main groups of goods and services	Structure of consumption (2005)				Rate of change 2005-1999		
	Poor hhds	Not Poor hhds	Total hhds	a/b	Poor hhds	Not Poor hhds	Total hhds
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
1. Cereal based food	4.93	2.15	2.31	2.3	-0.78	-0.1	-0.1
2. Food products of animal origin							
2a. strong connection with cereal							
meat	6.39	3.74	3.90	1.7	-0.86	-0.3	-0.3
milk, eggs	5.57	3.11	3.26	1.8	-0.29	-0.1	-0.1
2b. weak connection with cereal							
fish and fish products	2.11	1.41	1.45	1.5	-0.31	0.1	0.0
3. Vegetables and fruits	6.03	2.99	3.17	2.0	-0.69	-0.4	-0.5
4. Vegetables fats and oils	2.07	0.88	0.95	2.4	-0.04	0.0	-0.0
5. Other foods	3.66	2.58	2.64	1.4	0.42	0.29	0.2
Total of the above five items	30.77	16.86	17.68	1.8	-2.55	-0.6	-0.8
6. Beverages and tobacco	4.75	4.04	4.09	1.2	-1.04	0.3	0.2
7. Food and beverages (served)	5.66	9.30	9.08	0.6	-0.99	-0.1	-0.2
Total of the above two items	10.41	13.34	13.17	0.8	-2.03	0.2	0.1
8. Other non food expenditures	58.82	69.80	69.15	0.8	4.6	0.5	0.7
Total	100.00	100.00	100.00				

Source: Calculations based on primary Household Budget Statistics of 1998/99 and 2004/05 National Statistics Service of Greece.

Table 7 depicts the results of the analysis according to a classification of households in five (5) income quintiles. Again, major differences in the consumption patterns among the different classes are revealed. Presenting the results in this manner allows for the observation of consumption patterns for income classes in the middle of the income spectrum. One of the main findings figuring on Table 7 is that the average expenditure of all households in the country (column f) is, to a great extent, determined by the participation of the household class of the fifth quintile where households of the highest income belong.

This research proceeds to the examination of the Consumer Price Index (CPI) for every household class on a monthly basis by utilizing the relationships as defined by equations (1) and (2). Monthly CPIs were made available by the National Statistical Service for the period between January 2000 and December 2008. Year to year changes of such indexes (inflation) refer to the period from the year 2001 to 2008 (included). The CPI for each income class was estimated on the basis of consumption patterns characterizing each class as well as on the basis of the evolution of prices observed for each specific good or service.

Table 7: Structure of consumption expenditures and inflation by income quintile

Main groups of goods and services	1st poorest (a)	2nd (b)	3rd (c)	4th (d)	5th richest (e)	All hhds (f)
1. Cereal based food	4.64	3.29	2.70	2.20	1.40	2.31
2. Food products of animal origin						
2a. strong connection with cereal						
meat	6.14	5.03	4.49	3.98	2.77	3.91
milk, eggs	5.41	4.35	3.82	3.22	2.24	3.26
2b. weak connection with cereal						
fish and fish products	2.05	1.78	1.63	1.39	1.19	1.46
3. Vegetables and fruits	5.73	4.40	3.64	3.11	2.08	3.18
4. Vegetables fats and oils	1.98	1.45	1.14	0.86	0.54	0.95
5. Other foods	3.56	3.26	2.93	2.77	2.07	2.65
Total of the five above items	29.50	23.57	20.35	17.53	12.29	17.72
6. Beverages and tobacco	4.87	5.14	4.80	4.20	3.20	4.08
7. Food beverages (served)	5.98	7.23	8.57	9.57	10.32	9.10
Total of the two above items	10.85	12.38	13.37	13.77	13.52	13.18
8. Other non food expenditures	59.65	64.05	66.28	68.70	74.19	69.10
Total	100.00	100.00	100.0	100.0	100.0	100.0

Source: Calculations based on primary Household Budget Survey data of 2004/05 (National Statistical Service of Greece).

Table 8 reveals information that concerns changes in prices of individual groups of items. Average inflation for the six year period between 2001 and 2006 (column a) is estimated at the level of 3.37%, and changes in the price of food items are approximately of the same magnitude (3.43%). Average inflation for the year 2007 is 2.94% slightly lower as compared to the preceding period. However, major differences in price changes characterize the different food categories. More specifically, prices of category 1 (cereal based food), increased twofold as compared to the general price index whereas prices of vegetable oils (category 4) were compressed to even lower levels. Average inflation for the year 2008 (column e) was 4.15% at a time when food products' prices, in general, demonstrated an average increase by 5.38% while the prices of food products based on cereals were increased by 12.41%. In addition to products of category 1 (cereal based food) increases were recorded in subcategory 2a. Such increases refer more to milk and to a lesser extent to meat. Monthly price changes did not demonstrate a uniform steady trend during the year 2008. Prices displayed a steep increase during the first seven months of the year (January through July) in conformity with international developments.

Table 8: Changes in prices of individual groups of items

Main groups of goods and services	Average '01-'06	2007	2008 Jan-Jul	2008 Sep-Dec	2008
	(a)	(b)	(c)	(d)	(e)
1. Cereal based food	3.86	6.17	14,55	9,59	12.41
2. Food products of animal origin					
2a. strong connection with cereal					
:meat	3.07	2.22	3,66	3,81	3.72
:milk, eggs	4.02	3.48	7,81	4,34	6.33
2b. weak connection with cereal					
:fish and fishery products	3.24	4.53	3,55	3,95	3.72
3. Vegetable and fruits	2.90	5.35	5,56	3,98	4.91
4. Vegetable fats and oils	6.11	-6.81	3,14	0,52	2.05
5. Other foods	3.07	2.70	3,52	2,44	3.07
Total of the five above items	3.43	3.26	6,12	4,36	5.38
6. Beverages and tobacco	5.25	6.32	1,62	2,20	1.86
7. Food beverages (served)	4.30	3.97	5,01	5,53	5.23
Total of the two above items	4.59	4.70	3,93	4,48	4.16
8. Other non food expenditures[1]	3.12	2.51	4,28	3,21	3.83
Total	3.37	2.94	4,56	3,59	4.15

Source: Calculations based on data from the Consumer Price Index and the National Statistical Service of Greece.

Information on inflation related to household classes characterized as "*poor'* and "*not poor"*, according to the definition given, is displayed on Table 9. Calculations have been based on average yearly price increases observed in 2008 as compared to 2007. It is established in the analysis that the "*poor"* households are confronted with inflation at the level of 4.33% which is slightly higher than the country's average (4.14%). Food price increases seem to have contributed by 37% to total inflation that characterizes the *"poor"* households and by 21% to total inflation related to the *"not poor"* households. When inflation attributed to food is examined in isolation, it becomes apparent that the *"poor's*" inflation is substantially higher than the average inflation in the country and is higher than double inflation the *"not poor"* households are confronted with. Such differences become even more acute in the middle of the year 2008 when food price rises were at their peak. It seems that the example of Greece provides sufficient evidence in support of the hypothesis that the recent agricultural commodity price hikes have had a profound impact upon inflation that disproportionately aggravated citizens of low income.

[1] Expenditures for energy resources (for transportation or heating) are included in this category.

Table 9: Contribution of individual food product categories to overall inflation between *"poor", "not poor"* and total population (percentage points, 2008)

Main groups of goods and services	Inflation Poor	Inflation Not Poor	Overall Inflation
1. Cereal based food	0.60	0.26	0.28
2. Food products of animal origin			
2a. strong connection with cereal			
meat	0.23	0.13	0.14
milk, eggs	0.34	0.19	0.20
2b. weak connection with cereal			
fish and fishery products	0.08	0.05	0.05
3. Vegetable and fruits	0.29	0.14	0.15
4. Vegetable fats and oils	0.04	0.02	0.02
5. Other foods	0.11	0.08	0.08
A. Total of the five above items	1.62	0.88	0.92
6. Beverages and tobacco	0.09	0.07	0.07
7. Food beverages (served)	0.29	0.47	0.46
B. Total of the two above items	0.42	0.54	0.53
8. Other non food expenditures	2.29	2.71	2.68
Total	**4.33**	**4.13**	**4.14**
A/Total	0.37	0.21	0.22

Source: Calculations based on primary Household Budget Statistics data of 2004/05 and the Consumer Price Index of the National Statistical Service of Greece

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